

SCO M3: Solve problems, using SI and imperial units, that involve linear measurement using estimation and measurement strategies.
[ME, PS, V, C]

ACHIEVEMENT INDICATORS

- Provide referents for linear measurements, including millimetre, centimetre, metre, kilometre, inch, foot, yard and mile, and explain the choices.
- Compare SI and imperial units, using referents.
- Estimate a linear measure, using a referent, and explain the process used.
- Justify the choice of units used for determining a measurement in a problem-solving context.
- Solve problems that involve linear measure, using instruments such as rulers, callipers or tape measures.
- Describe and explain a personal strategy used to determine a linear measurement such as circumference of a bottle, length of a curve, or perimeter of the base of an irregular 3-D object.
- Solve a problem that involves the conversion of units within or between SI and imperial systems.
- Verify, using unit analysis, a conversion within or between SI and imperial systems, and explain the conversion.
- Justify, using mental mathematics, the reasonableness of a solution to a conversion problem.

Useful Referents for Common Metric Measurements

Linear Measurement

A **referent** is an object that represents approximately one unit of measurement.

- Centimeter: the width across a child's little finger at the first joint, or the width of a standard paper clip
- Millimeter: the thickness of a dime, or the diameter of the wire on a standard paperclip
- Meter: height of a door knob from the floor
- Kilometer: distance you could walk comfortably in 15 minutes; or six-tenths of a mile

One Km:
From OHS to
the mall

Mass

- Gram: a regular jelly bean, a standard paper clip
- Milligram: one thousandth of a regular jelly bean
- Kilogram: two footballs, a little more than 2 pounds (2.2 pounds)

Volume

- Milliliter: the liquid you could fit in a regular-sized jelly bean or in a base-10 unit cube
- Liter: a "1-liter" bottle, a little more than a quart (1.06 quarts)

Useful Referents for Common Imperial Measurements

One inch:

A standard way to measure one inch is to use the second knuckle of your index finger

One foot:

- A men's size 14 shoe is exactly one foot long.
- There is the \$5 foot long sub at Subway.
- And, it is often 1 foot from elbow to wrist

One mile:

-A mile would be from OHS to the main entrance of CFB Movie theaters. (turning right at the lights at Ridgeview School)

One yard:

- there are 3 feet in one yard
- a little less than one meter

How to convert between SI units and Imperial units:

The Conversion Factors Between SI and Imperial Units

SI to Imperial

$$1 \text{ mm} = 0.0394 \text{ in}$$

$$1 \text{ cm} = 0.3937 \text{ in}$$

$$1 \text{ m} = 3.2808 \text{ ft}$$

$$1 \text{ m} = 1.0936 \text{ yd}$$

$$1 \text{ km} = 0.6214 \text{ mi}$$

Imperial to SI

$$1 \text{ in} = 25.4 \text{ mm}$$

$$1 \text{ inch} = 2.54 \text{ cm}$$

$$1 \text{ ft} = 0.3048 \text{ m}$$

$$1 \text{ yd} = 0.9144 \text{ m}$$

$$1 \text{ mi} = 1.6093 \text{ km}$$

Conversion b/w SI and Imperial

$$1 \text{ kg} = 2.2 \text{ lb}$$

*handout

$$454 \text{ g} = 1 \text{ lb}$$

$$2000 \text{ lb} = 1 \text{ ton (imperial)}$$

$$2200 \text{ lb} = 1 \text{ tonne} = 1000 \text{ kg}$$

(metric)

Example 1:

$$40 \text{ m} = \underline{\hspace{2cm}} \text{ in}$$

$$40 \cancel{\text{m}} \times \frac{100 \cancel{\text{cm}}}{1 \cancel{\text{m}}} \times \frac{0.3937 \text{ in.}}{1 \cancel{\text{cm}}} = 1574.8 \text{ in}$$

Example 2:

$$2 \text{ km} = \underline{\hspace{2cm}} \text{ in}$$

$$2 \cancel{\text{km}} \times \frac{100000 \cancel{\text{cm}}}{1 \cancel{\text{km}}} \times \frac{0.3937 \text{ (in)}}{1 \cancel{\text{cm}}} = 78740 \text{ in}$$

Example 3:

$$15) 12 \text{ yd} = \underline{\hspace{2cm}} \text{ cm}$$